Chapter 3

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River herring

Alternatives, Including the Service-preferred Alternative

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Introduction

This chapter presents

- our process for formulating three management alternatives;
- actions that are common to all alternatives;
- actions that are common to alternatives B and C;
- actions or alternatives considered but not fully developed; and
- descriptions of the three alternatives we analyzed in detail.

At the end of this chapter, table 3.2 compares how each of the alternatives addresses key issues, supports major programs, and achieves refuge goals. Goals 1 through 4 apply to Great Bay Refuge management, while goal 5 applies to the Karner blue butterfly conservation easement.

Formulating Alternatives

Relating Goals, Objectives, and Strategies

Refuge goals and objectives define each of the management alternatives identified below. As we described in chapter 1, developing refuge goals was one of the first steps in our planning process. Goals are intentionally broad, descriptive statements of the desired future condition of refuge resources. By design, they are less quantitative, and more prescriptive, in defining the targets of our management. They also articulate the principal elements of refuge purposes and our vision statement, and provide a foundation for developing specific management objectives and strategies. Our goals are common to all the alternatives.

The next step was to consider a range of possible management objectives that would help us meet those goals. Objectives are essentially incremental steps toward achieving a goal. They also further define the management targets in measurable terms. Objectives typically vary among the alternatives and provide the basis for determining more detailed strategies, monitoring refuge accomplishments, and evaluating our success. The Service guidance in "Writing Refuge Management Goals and Objectives: A Handbook" (USFWS 2004a) recommends that objectives meet five criteria to be "SMART":

(1) Specific
(2) Measurable
(3) Achievable
(4) Results-oriented
(5) Time-fixed

A rationale accompanies each objective to explain its context and why we think it is important. We will use the objectives in the alternative selected for the final CCP in writing refuge step-down plans. We will measure our successes by how well we achieve those objectives.

We next identified strategies for each of the objectives. Strategies are specific actions, tools, and techniques that we may use to achieve the objective. The list of strategies under each objective represents the potential suite of actions that we may implement. We will further evaluate most of the strategies in refuge step-down plans, such as the HMP and Visitor Services Plan, as to how, when, and where they should be implemented.

For most objectives we also identified monitoring components. Monitoring will help us measure our success toward meeting the objective.

Developing Alternatives, including the "No Action" Alternative

After identifying a wide range of possible management objectives and strategies, we began the process of crafting management alternatives. Simply put, alternatives are packages of complementary objectives and strategies designed to meet refuge purposes and goals and the Refuge System mission,

while responding to the issues and opportunities identified during the planning process.

To develop alternatives, we grouped objectives that seemed to fit together in what we loosely called "alternative themes." For example, we considered such themes as "continuing current management," "habitat and focal species management," and "emphasis on natural processes." These were firmed up into three management alternatives after further evaluating how respective objectives would interact, their compatibility with refuge purposes, and the reality of accomplishing the objectives in a reasonable timeframe.

In this draft CCP/EA, we fully analyze three alternatives which characterize different ways of managing the refuge over the next 15 years: alternative A, alternative B, and alternative C. We believe they represent a reasonable range of alternative proposals for achieving refuge purposes, vision and goals, and addressing the issues described in chapter 1. Unless otherwise noted, all actions would be implemented by refuge staff.

Alternative A, "Current Management"
Alternative A satisfies the NEPA requirement of a "no action" alternative, which we define as "continuing current management." It describes our existing management priorities and activities, and serves as a baseline for comparing and contrasting alternatives B and C. We suggest you first read Chapter 2, "Description of the Affected Environment," for detailed descriptions of current refuge resources and programs.

Many of the objectives in alternative A do not strictly follow the guidance in the Service's goals and objectives handbook. This is because we are describing current management decisions and activities that were established prior to this guidance. Our descriptions of these activities were derived from a variety of formal and informal management decisions and planning documents, such as the draft HMP and a Fisheries Management Plan. As such, alternative A objectives are fewer and more subjective in nature than alternatives B and C. Even though there are several objectives that are not currently being implemented under alternative A, we list goals and objectives in the same sequence and with the same title under all three alternatives to facilitate their comparison. Where an objective does not apply under alternative A, we indicate "this objective is not part of current management."

Alternative B, "Habitat Diversity and Focal Species Emphasis" (Service-preferred Alternative)
Alternative B, the Service-preferred alternative, combines the actions we believe would best achieve the purposes, vision, and goals of Great Bay Refuge and the Karner blue butterfly easement, and also responds to public issues. It emphasizes the management of specific refuge habitats to support focal species whose habitat needs benefit other species of conservation concern that are found in the Great Bay region. In particular, we emphasize habitat for

- priority birds identified in BCR 30, such as the upland sandpiper;
- rare and declining species, such as the New England cottontail and Karner blue butterfly; and
- estuarine species of concern, including oysters and eelgrass that are indicators of ecosystem health.

In alternative B, we propose removing the Lower Peverly Pond Dam to restore stream habitat, while maintaining the dams at Upper Peverly and Stubbs Ponds

to benefit a range of fish and wildlife. We would expand our conservation, research, and management partnerships to help restore and conserve the Great Bay estuarine ecosystem.

This alternative would enhance our visitor services programs, which has been limited under current management due to lack of staff. On Great Bay Refuge, we propose to enhance the entrance to the refuge, create new interpretive materials, expand on an existing quality volunteer program, and offer visitors more opportunities to learn about the refuge and the surrounding area. On the Karner blue butterfly easement, we propose to install new interpretive signs, offer guided interpretive walks, and enhance our Web-based information.

Alternative C, "Emphasis on Natural Processes"
Under alternative C, we would emphasize "naturalness," with a greater reliance on natural processes such as forest succession, and where feasible, restoration of natural communities. In this alternative we would continue to manage invasive species, but would allow grasslands and shrublands to naturally succeed to forested conditions.

In addition to the removal of the Lower Peverly Pond Dam, we would remove the dike on Stubbs Pond and restore the area to salt marsh. We would also evaluate the feasibility of removing the Upper Peverly Pond Dam. All remaining structures in the former Weapons Storage Area would be removed.

Under alternative C, we would allow some additional public access into certain new areas on the refuge not currently open to the public since we would anticipate a reduction in sensitive breeding periods as fields and shrubs succeed to forest. Our objectives and strategies for managing the Karner blue butterfly easement would be the same under alternative C as proposed under alternative B.

We include a habitat map for each alternative for Great Bay Refuge to help visualize how refuge vegetation would look under each alternative (maps 3.6, 3.8, and 3.14). In addition, we include a similar comparison for the visitor services program under the three alternatives (maps 3.7, 3.9, 3.10, and 3.15). Table 3.1 compares the acreages of the habitat types under the different alternatives.

Table 3.1. Comparison by Alternative of Habitat Types Under Management for the Great Bay Refuge

Habitat Type	Alternative A	Alternative B	Alternative C
Forest	659	700	852
Shrubland	26	54	0
Grassland	169	98	0
Forested wetlands	149	158	169
Impounded freshwater wetland	62	55	0
Salt marsh	36	36	80
Rocky shore	2	2	2
TOTAL	**1,103**	**1,103**	**1,103**

**Acres estimated from GIS and rounded up to nearest whole number*

Actions Common to All of the Alternatives

There are some actions we propose for managing Great Bay Refuge over the next 15 years, regardless of which CCP alternative we select. Some of those actions are required by law or policy, or represent actions that have undergone previous NEPA analysis, public review, agency review, and approval. Others may be administrative actions that do not necessarily require public review, but we want to highlight in this public document.

It is important here to reemphasize that CCPs provide long-term guidance for management decisions through goals, objectives and strategies. They represent our best estimate of future needs. This CCP details program levels and activities that are substantially above current budget allocations and, as such, should be viewed as strategic in nature. Our budgets are determined annually by Congress, and distributed through our Washington and Regional Offices, before arriving at field stations. In summary, the actions proposed in this CCP represent our strategic vision for the future. Final CCPs do not constitute a Service commitment for staffing increases, or funding for operations, maintenance, or future land acquisition. Implementation must be adjusted annually given the reality of budgets, staffing, and unforeseen critical priorities.

All of the following actions, which we discuss in more detail below, are current practices or policies that would continue in some form under all alternatives, though they may differ in details under each alternative:

- Using an adaptive management approach where appropriate
- Reducing impact on climate change
- Developing refuge step-down plans
- Managing invasive species
- Providing refuge staffing and administration
- Findings of appropriateness and compatibility determinations
- Protecting the rocky shore
- Recognizing special designations
- Conducting wilderness and wild and scenic river reviews
- Protecting cultural resources
- Issuing special use permits
- Distributing refuge revenue sharing payments
- Conducting additional NEPA analysis when required

Adaptive Management

All of the alternatives will employ an adaptive management approach for improving resource management by better understanding ecological systems through iterative learning. In 2007, Secretary of Interior Dirk Kempthorne issued Secretarial Order No. 3270, "Adaptive Management"(dated March 9, 2007) to provide guidance on policy and procedures for using adaptive management in Department of Interior agencies. In response to that order, an intradepartmental working group developed a technical guidebook to assist managers and practitioners,"Adaptive Management: The U.S. Department of Interior, Technical Guide." It defines adaptive management, the conditions under which we should consider it, the process for implementing it, and evaluating its effectiveness (Williams et al. 2007). You may view the technical guidebook at: *http://www.doi.gov/initiatives/AdaptiveManagement/documents.html* (accessed May 2011).

The guidebook provides the following definition for adaptive management:

> Adaptive management is a decision process that promotes flexible decisionmaking that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes

> learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social and economic goals, increases scientific knowledge, and reduces tensions among stakeholders.

This definition gives special emphasis to the uncertainty about management impacts, iterative learning to reduce uncertainty, and improved management as a result of continuous learning. This approach recognized that we can never achieve perfect understanding of the natural world and that we must implement management in the face of uncertainty. At the refuge level, adaptive management is an integral part of management planning, research design, and monitoring. Uncertainties about ecological systems are addressed through targeted monitoring of resource response to management actions and predictive models that mimic the function of the natural world.

Adaptive management gives the refuge manager flexibility to adjust management action or strategies if they do not meet goals or objectives. Significant changes from what we present in our final CCP may warrant additional NEPA analysis and public comment. Minor changes will not, but we will document them in our project evaluation or annual reports. Implementing an adaptive management approach supports all refuge goals. Furthermore, adaptive management is all the more compelling in light of climate change concerns.

Climate Change

There is consensus among the scientific community that global climate change, occurring in part as a result of emissions of carbon dioxide and other greenhouse gases from human activities, will lead to significant impacts across the U.S and the world (Joint Science Academies' Statement 2005, *http://www.nationalacademies.org/onpi/06072005.pdf*, accessed May 2011). This includes sea level rise adding stress to coastal communities and ecosystems (Wigley 2004). The effect of climate change on wildlife and habitats is expected to be variable and species-specific, with a predicted general trend of species ranges and vegetation communities shifting northward and higher in elevation.

Uncertainty about the future effects of climate change requires refuge managers to use adaptive management to maintain healthy ecosystems in light of unpredictability (Inkley et al. 2004). This involves improving or adjusting policies and practices based on the outcomes of monitoring or management activities and may result in changes to regulations, shifts in active habitat management, or changes in management objectives. A few recommendations include

- preparing for diverse and extreme weather conditions (e.g., drought and flood);
- maintaining or restoring healthy, connected, and genetically diverse wildlife populations to increase resiliency in wildlife and habitats; and
- protecting coastal habitats to accommodate marsh migration in response to sea level rise (see Inkley et al. 2004 for more recommendations).

GBNERR and the Great Bay Stewards were awarded a grant to study climate change impacts in the Great Bay Estuary in 2010. Under all alternatives, we would use results from this study to inform management decision and support Great Bay Stewards in community outreach to reduce human activities that impact wildlife or habitat migration. We would also pursue the following strategies to reduce our greenhouse gas emissions and help reduce our impact on climate change:

- Support community proposals to develop a regional bike trail. The proposal includes linking a regional trail to the entrance road to the refuge, allowing visitors to reach the refuge using alternative transportation. However, bicycling off-road is not allowed on the refuge.

- Reduce the carbon footprint of facilities, vehicles, workforce, and operations. Some examples include:
  - Use energy efficient equipment, where feasible.
  - Maintain buildings using sustainable, green building technologies.
  - Conduct an energy audit by 2012.

We will help implement the Service's Climate Change Strategic Plan and work with our State and other conservation partners on mitigating and adapting to this conservation challenge. We describe that strategic plan and other important Service guidance on climate change in chapter 1.

Step-down Plans

Service planning policy identifies 25 step-down plans that may be applicable on any given refuge. We have identified the following plans listed below as the most relevant to this planning process, and have prioritized their completion. Sections of the refuge HMP which require public review are presented within this document and will be incorporated into the final version of the HMP immediately upon CCP approval. The highest priority step-down plans, regardless of the alternative selected, are the Annual Habitat Work Plan (AHWP) and Inventory and Monitoring Plan (IMP). These are described in more detail below. They will be modified and updated as new information is obtained so we can continue to keep them relevant.

The following step-down plans are completed for the refuge and are incorporated by reference into the CCP:

- Chronic Wasting Disease Plan (2008)
- Avian Influenza Disease Contingency Plan (2006)
- Fire Management Plan (2004)
- Fishery Management Plan (1994)
- Hunt Plan (1993)

All of the alternatives schedule the completion of the following step-down management plans as shown.

- A HMP, within 1 year of CCP approval. (see discussions below on HMP and NEPA requirements; we will use the 2006 draft HMP to the extent that it is consistent with final CCP)
- An IMP, within 5 to 10 years of CCP approval (see discussion below)
- Visitor Services Plan, within 3 years of CCP approval (we will use the 1993 Public Use Plan to the extent that it is consistent with the final CCP).
- Law Enforcement Plan, within 3 years of CCP approval.
- Facilities and Sign Plan, within 3 years of CCP approval.
- Fire Management Plan (FMP), rewritten and completed by 2013.

Habitat Management Plan
A HMP for the refuge is the requisite first step to achieving the objectives of goals 1, 2, and 5, regardless of the alternative selected for implementation. The HMP will provide more details on the habitat management strategies we would use to accomplish CCP goals and objectives over the next 15 years. In particular, the HMP will detail the specific areas and habitat types we will manage for, as well as the tools and techniques we will use and the timing of our management actions. Additional analysis of the impacts of specific methods may be necessary. The HMP will also incorporate the results of appendix B, which identifies how we

derived focal species and habitats for the refuge. We will revise and update the draft HMP, developed in 2006, once the CCP is completed.

In this CCP, the goals, objectives, and of strategies identify how we intend to manage habitats on the refuge. Both the CCP and HMP are based on current resource information, published research, and our own field experiences. Our methods, timing, and techniques will be updated as new, credible information becomes available. To facilitate our management, we will regularly maintain our GIS database, documenting any major vegetation changes on at least a 5-year basis.

Annual Habitat Work Plan
The AHWP is generated each year from the HMP, and outlines specific management activities to occur in that year. Regardless of the alternative chosen, these plans are also vital for implementing habitat management actions and measuring our success in meeting the objectives.

Fire Management Plan
According to Service fire policy, all FMPs should be reviewed annually and updated with current information. Great Bay Refuge's FMP is currently being rewritten and will be completed in 2012. Once the CCP is complete, the FMP will be reviewed and changes to FMP made, as necessary, to reflect management changes identified in the CCP.

Inventory and Monitoring Plan
The IMP will outline and prioritize inventorying and monitoring activities for the refuge. We will use our inventory and monitoring program to assess whether our original assumptions and proposed management actions are supporting our habitat and species objectives. The results of inventories and monitoring will provide us with more information on the status of our natural resources and allow us to make more informed management decisions. The Service's Inventory and Monitoring Policy is currently in draft form, and national and regional staff are currently developing a new template for IMPs. We will incorporate recommendations from the "Strategic Plan for Inventories and Monitoring on National Wildlife Refuges: Adapting to Environmental Change" (USFWS 2010) to ensure a coordinated approach to inventory and monitoring across refuges. The IMP also incorporate the monitoring elements identified under each of the biological objectives for the selected CCP alternative.

Invasive Species Management

The Service identifies an "invasive species" as a species that is nonnative to an ecosystem, and whose introduction causes, or is likely to cause, harm to the economy, environment, or human health (Executive Order 13112).

The unchecked spread of invasive plants threatens the biological diversity, integrity, and environmental health of all refuge habitats. In many cases, invasive species outcompete native species and become the dominant cover. This reduces the availability of native plants as food and cover for native wildlife. Over the past several decades, government agencies, conservation organizations, and the public have become more aware of the negative effects of invasive species. One report estimated the economic cost of invasive species in the U.S. at $137 billion every year (Pimentel et al. 2000). Up to 46 percent of the plants and animals federally listed as threatened and endangered have been negatively impacted by invasive species (Wilcove et al. 1998, National Invasive Species Council 2001).

The Service in Region 5 initiated an effort to systematically identify, locate, and map invasive plant species occurring on refuge lands leading to an effective integrated management plan. Great Bay Refuge initiated a baseline inventory and mapping of invasive species in 2002. Field surveys during 2002 to 2010 detected 34 invasive species (see table 2.10 in chapter 2). The Refuge will use this information to guide the development of monitoring, control, and eradication

projects. When control is deemed necessary, the refuge will use the most effective combinations of mechanical, biological, and chemical controls to achieve long-term control or eradication. Only herbicides approved by the regional contaminants coordinator will be used, and only in accordance with approved rate and timing of application.

Great Bay Refuge is also part of CWIPP, a partnership among 11 agencies and organizations formed in 2008 to address the effects of invasive plants across jurisdictional boundaries. The CWIPP signatories agreed that it was to their mutual benefit and interest to work cooperatively to inventory, monitor, control, and prevent the spread of invasive plants across jurisdictional boundaries within New Hampshire's coastal watershed. The goal through this cooperative effort is to achieve better management of invasive plants while improving working relationships between the signatories and the public. Great Bay Refuge, although not a signatory to CWIPP, is a "sustaining partner." Sustaining partners are organizations or agencies with a significant interest in the success of the partnership. (*http://des.nh.gov/organization/divisions/water/wmb/coastal/cwipp/index.htm*, accessed May 2011).

Under all alternatives we would continue to implement the following strategies:

- Continue to follow the national guidance on invasive species provided in the Service Manual (620 FW 1.7G).
- Complete the inventory and mapping of invasive plant species and prioritize invasive species to be controlled or eradicated. Implement controls using biological, ecological, mechanical, prescribed fire, or chemical techniques, as needed.
- Participate in the CWIPP for early detection and monitoring of invasive species, and become a signatory to CWIPP.
- Work with NHFG to control and removal of mute swan from the refuge. The Service goal is zero productivity for mute swans in the Northeast Region, due to the negative impact of this nonnative swan on native waterfowl and their habitats.

Refuge Staffing and Administration

Staffing and Operational Budgets

Staffing and operations and maintenance funds over the last 5 years are presented in chapter 2. Our objective is to sustain annual funding levels that allow us to achieve our refuge goals, objectives, and strategies. The lack of staff over the last 3 years has limited our capability to conduct priority work, such as major maintenance projects, biological inventory and monitoring, outreach, and public use programs. If our base budget were to increase and stay stable for the foreseeable future, we would propose additional staff to help us achieve our goals and objectives, as outlined for alternatives B and C below.

Appendix C includes our construction and maintenance projects currently listed in the RONS and SAMMS databases, and indicates the regional and refuge ranking for each project.

Facility Maintenance

All of the alternatives include the periodic maintenance and renovation of existing facilities to ensure the safety and accessibility for staff and visitors. Our current facilities are described in chapter 2.

Refuge Operating Hours

All of the alternatives will open the refuge for public use from sunrise to sunset, 7 days a week, with a priority to ensure visitor safety and protect refuge resources. However, the refuge manager does have the authority to issue a special use permit to allow access outside these timeframes. For example, researchers or

hunters may be permitted access at different times or in areas that may not be open to the general public. The refuge manager may also permit organized groups to conduct nocturnal activities, wildlife observation, environmental education, and interpretive programs. The Great Bay Refuge office is currently closed because the refuge is unstaffed. The office will remain closed until staff positions are filled.

Findings of Appropriateness and Compatibility Determinations

Chapter 1 describes the requirements for findings of appropriateness and compatibility determinations. Appendix C includes appropriateness and compatibility determinations consistent with implementing alternative B, the Service-preferred alternative. Some of these uses are already approved, while others are presented here in draft for public review. Our final CCP will include all approved findings of appropriateness and compatibility determinations for the alternative selected. These activities would be evaluated based on whether or not they contribute to meeting refuge purposes, goals, and objectives.

Activities Not Allowed

We occasionally receive requests for activities that we do not allow under 50 CFR on Great Bay Refuge. The refuge manager has determined that these activities are not appropriate on the refuge or are sufficiently provided elsewhere nearby on other ownerships. These activities will continue to be prohibited on refuge lands under all alternatives. The only exceptions would be at the discretion of the refuge manager, under specific, special circumstances (e.g., to accommodate visitors with disabilities), and would require the issuance of a special use permit. Appendix C documents the refuge manager's justification for why they are deemed not appropriate. The activities not allowed on refuge lands include: motorized vehicles, bicycles, pets, and horseback riding.

Protecting the Rocky Shore

Great Bay Refuge has about 2 acres of rocky shoreline. Woodman Point overlooks a portion of this shoreline and is an important roost site for bald eagles wintering on Great Bay. Thomas Point and the 0.25-acre Nannie Island off Woodman Point also support rocky shore. The objective under all three alternatives is to maintain this area as undisturbed habitat for these birds of conservation concern.

We are excited to announce that in April 2011 a new, active bald eagle nest was discovered on Fabyan Point. This nest is the first bald eagle nest for the refuge. Due to the location of the nest site, no management actions have been necessary to restrict public use or access. The only change we have made is to place a gate across the top of Fabyan Point Road, which was already closed to public access. The gate was installed to provide further protection from trespassers who might disturb the nesting pair.

We will continue to implement the following strategies:

Woodman Point

USFWS

- Evaluate the importance of Nannie Island and surrounding waters to migratory birds and other Federal trust resources to determine if the island should remain closed to public access or open for recreation or education purposes.

- Monitor the wintering and nesting bald eagle population on and around the refuge.

Special Designations

Marine Protected Areas

All coastal national wildlife refuges are part of the national system of marine protected areas (MPA). The goal of the MPA program is to conserve the nation's natural and cultural marine heritage and to ensure the sustainable production of marine resources. Specifically, Great Bay Refuge contributes to the following MPA conservation objectives:

- Provides reproductive and nursery grounds and foraging areas for fish and shellfish

- Supports areas for migratory birds

- Provides linked areas important to life histories of marine organisms

- Offers compatible opportunities for education and research

Protecting Cultural Resources

As a Federal land management agency, we are responsible for locating and protecting cultural resources, including archaeological sites and historic structures that are eligible for the National Register of Historic Places. That applies not only to resources that are located on refuge lands, but also those on lands affected by refuge activities, as well as any museum properties.

As mentioned earlier, the Margeson Estate is listed on the National Register. We have initiated consultation with SHPO to evaluate the structures in the former Weapons Storage Area and on Fabyan Point to determine their eligibility for the National Register.

Under all alternatives, we would conduct an evaluation of the potential for our projects to affect archaeological and historical resources, and would consult with our Regional Historic Preservation Officer (RHPO) and the SHPO, as appropriate. In particular, we would consult with the RHPO and SHPO on actions such as

- the rehabilitation, moving, or demolition of historic structures;

- the construction of new buildings in the "area of potential effect" of the historic structures; and

- projects that include moving or displacing soil.

Pre-project consultation with SHPO staff will ensure that we comply with section 106 of the National Historic Preservation Act, regardless of the alternative implemented. Section 106 Review involves consultation between the Service's cultural resource staff and the SHPO project review staff, and a section 106 review report generated by the Service that describes the undertaking, the historic resources, the effect of the project on the historic resources, recommendations for avoiding adverse effect to the historic resources, and mitigation measures in the case where adverse effect cannot be avoided. Mitigation measures may include photographic and written documentation, interpretive exhibits, and archaeological surveys. The section 106 review process also includes public involvement, with information on the undertaking submitted

to the Newington Certified Local Government and Newington Historical Society for comment.

Special Use Permits

All of the alternatives would require the refuge manager to evaluate activities that require a special use permit for their appropriateness and compatibility on a case-by-case basis. All research, commercial, and economic uses, and groups of 10 or more people, require special use permits. In the past the refuge manager has issued special permits for wildlife inventories, research, hunting and partner-led educational programs.

Refuge Revenue Sharing Payments

National wildlife refuges contribute to local economies through shared revenue payments. Federally owned lands are not taxable; but, under the provisions of the Refuge Revenue Sharing Act, the municipality or other local unit of government receives an annual refuge revenue sharing payment to offset the loss of property taxes that would have been collected if the land had remained in private ownership. In addition, federally owned land requires few services from municipalities, yet it provides valuable recreational opportunities for local residents. As we describe in chapter 2, we pay the town of Newington annual refuge revenue sharing payments based on the acreage and the appraised value of refuge lands. The annual payments are calculated by formula determined by, and with funds appropriated by, Congress. Under all alternatives, we will continue those payments in accordance with the law, commensurate with changes in the appraised market value of refuge lands, or new appropriation levels dictated by Congress.

Additional NEPA Analysis

For all major actions, NEPA requires site-specific analysis and disclosure of their impacts, either in an EA or an environmental impact statement (EIS). Most of the major actions proposed in the three alternatives are fully analyzed and described in enough detail in this draft CCP/EA to comply with NEPA and would not require additional environmental analysis. Although this is not an all-inclusive list, the following projects fall into this category:

- Projects common to all alternatives
  - Biological inventories and monitoring
  - Minor modifications to our public use programs
  - Controlling invasive plants and animal pests
- Projects proposed under alternatives B and C only
  - A new refuge headquarters and visitor contact facility
  - Extending existing trails
  - Removal of Lower Peverly Pond Dam
  - Converting existing grasslands to shrub habitat to benefit the federally listed candidate New England cottontail.

Although we analyze in this draft CCP/EA the impacts of the management alternatives we have developed, additional NEPA analysis will be necessary for certain types of actions, even once we adopt a final CCP. Where decisions have not been made in this CCP, but must be made later, we analyze the impacts of the possible range of alternatives in this document, but may need to supplement this analysis later. An example of this is our proposal under alternatives B and C to expand the hunting program. We analyze the impacts of the expanded program at a general level herein, but this analysis will have to be supplemented before a final decision on whether to go forward with the proposed expanded hunt particular design is reached. Similarly, if we pursue the proposal under alternative C to remove all three dams along Peverly Brook, adoption of such recommendations would require additional analysis. In each case these are management actions whose precise details, and therefore consequences, cannot be known by the Service at this time.

Actions Common to Alternatives B and C

New Facilities, Staffing, and Maintenance

The existing refuge office does not have enough space to serve as both an administrative office and visitor contact station, given our anticipated needs over the next 15 years. Under alternatives B and C, we propose to expand visitor services and resource management, which would require additional space for both staff and visitors.

Appendix C includes construction and maintenance projects proposed in alternative B, buy not yet in the SAMMS and RONS databases. Once approved, if funding is not available, we would continue to seek alternative means of accomplishing our projects, for example through our volunteer program, challenge cost share grants, other partnership grants, or internships.

Under alternatives B and C, we would seek to fill our four approved, but vacant, staff positions which we believe are needed to accomplish our highest priority projects. The positions are:

(1) Assistant refuge manager
(2) Refuge wildlife biologist
(3) Visitor services specialist
(4) Maintenance worker

Peverly Pond Trail

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To accommodate increases in staff, we propose to construct a new administration/visitor contact facility. We would build the facility in an already disturbed area in the former Weapons Storage Area. The building would be approximately 7,000 square feet and follow Service's standard design for a small building and visitor contact facility (see appendix J). The new facility would have space for the four proposed position. The facility would also have space for two Wapack Refuge staff and a shared refuge law enforcement officer for Parker River, Great Bay, and Wapack Refuges. Finally, it would continue to provide office space for up to four regional office staff.

We also propose to build a separate new maintenance facility, given problems with the existing facility. The existing maintenance area is poorly sited and flooding has been a problem.

Strategies:

- Relocate the recreational vehicle (RV) pad, used by volunteers as housing, from the Caretakers Cottage to across from staff residence (at former kennel area), and increase number of power connections.
- Construct maintenance and storage building.
- Construct a new office/visitor facility adjacent to the existing office to house and support existing and proposed staff positions.

- Convert all Service roads beyond the residence and maintenance shop from pavement to gravel.
- Remove existing headquarters building.
- Convert existing shop to storage area

Land Protection Focus Areas

During the CCP process, several focus areas were identified by partners and the public for our planning team to consider for Service acquisition. Conservation of lands within these focus areas would support Great Bay Refuge's purposes, and the Refuge System and Service missions, with particular emphasis on protecting species of conservation concern, such as the Karner blue butterfly (federally endangered), the New England cottontail (Federal candidate species), and salt marsh sparrow (a State species of concern), and other Federal trust resources in the Great Bay/Coastal and Concord Pine Barrens ecosystems of New Hampshire. For alternatives B and C, we include several of those focus areas identified. We propose to evaluate these focus areas within the next 5 years to assess whether additional land protection is warranted to conserve Federal trust resources and, whether Service land acquisition from willing sellers is recommended.

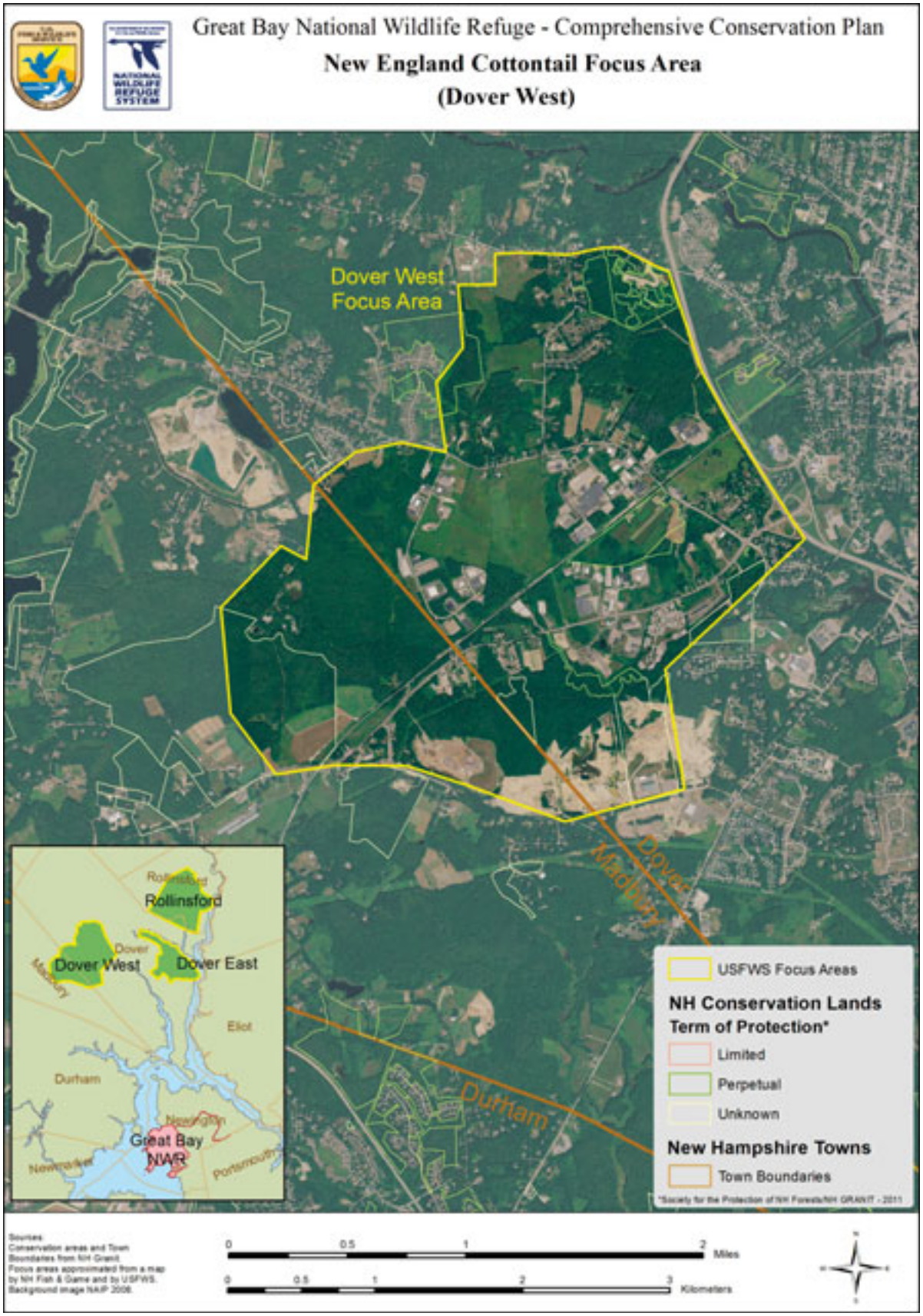
Within 5 years of CCP approval, we would conduct a biological analysis of these focus areas, to identify those specific areas that would improve resource protection for Federal trust species and aid in fulfilling the mission of the Refuge System and the purposes of the refuge. If the review determines that additional land protection by the Service should be pursued then we would initiate all necessary administrative procedures to expand the boundary of the refuge. If the Service's Director grants approval to continue the effort, we will prepare a separate EA and Land Protection Plan (LPP) to analyze all factors involved in a refuge expansion and propose an alternative for public consideration. We expect that any proposal which might emerge from this process will include significant public involvement in decisionmaking, involve partners in the protection effort, and will utilize the full range of protection methods, including management agreements, conservation easements, and fee acquisition.

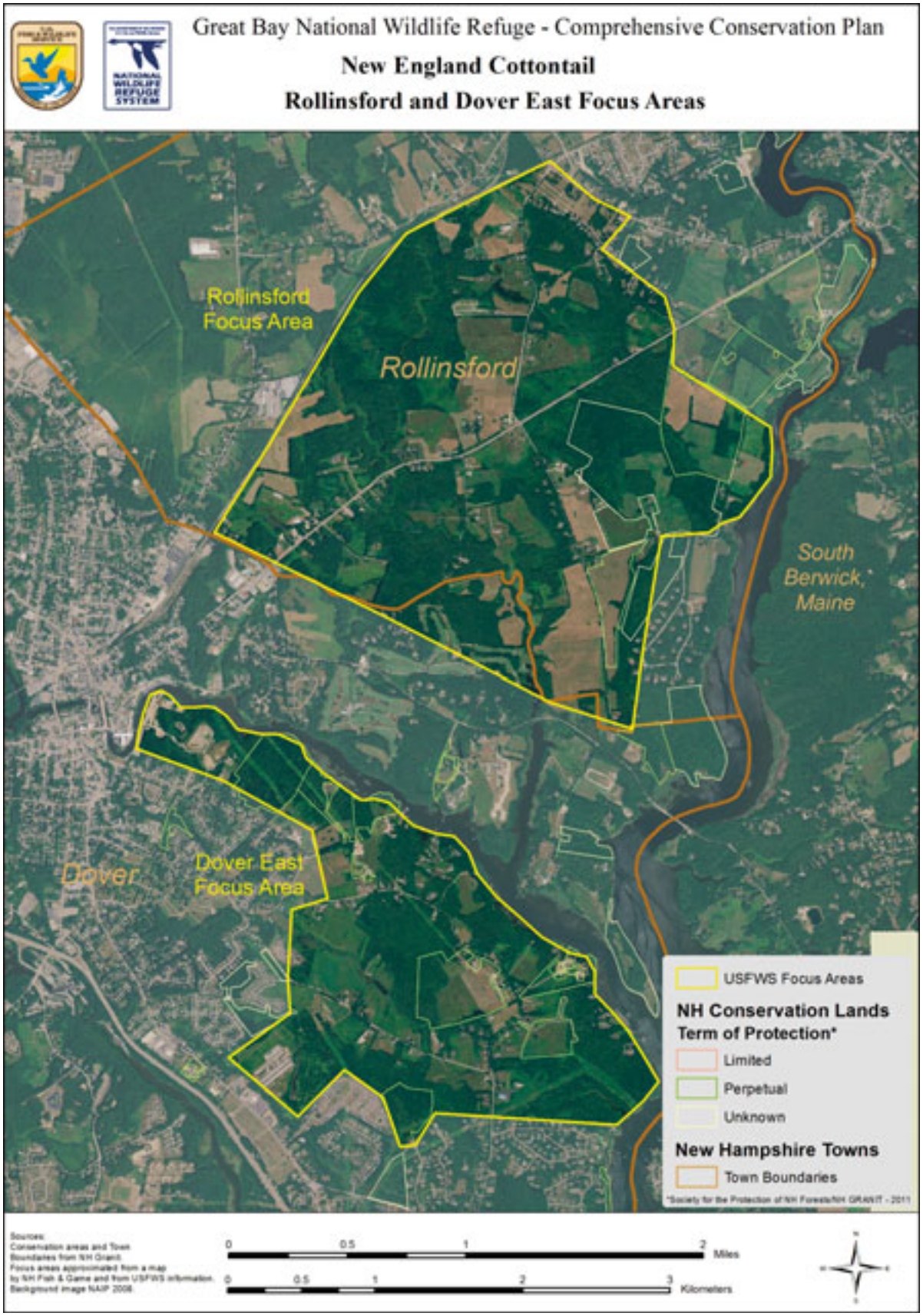
We have organized the following discussion of proposed focus areas under two subheadings:

(1) Focus areas in coastal New Hampshire
(2) Focus area for Karner blue butterfly near the Concord pine barrens

Focus Areas in Coastal New Hampshire
We have identified several focus areas of high value habitats, including early successional habitat for New England cottontail and coastal and estuarine salt marsh. In consultation with our conservation partners in the region, we identified these high priority areas:

- *West Dover/ East Dover/Rollinsford Focus Areas* (map 3.1 and 3.2): NHFG identified a focus area from the existing Bellamy River Wildlife Management Area in Dover west and east of Route 16 and into Rollinsford, about 5 miles north of the existing Great Bay Refuge. The goals are to recover
  - the New England cottontail, a Federal candidate species, before it is listed,
  - a suite of declining early successional migratory birds, such as American woodcock, whip-poor-will, eastern towhee, brown thrasher, blue-winged warbler, and prairie warbler; and


Great Bay National Wildlife Refuge - Comprehensive Conservation Plan
New England Cottontail Focus Area
(Dover West)
Dover West Focus Area
Dover
Madbury
Durham
Rollinsford
Dover West
Dover East
Eliot
Durham
Newington
Great Bay NWR
Newmarket
Portsmouth
USFWS Focus Areas
NH Conservation Lands
Term of Protection*
Limited
Perpetual
Unknown
New Hampshire Towns
Town Boundaries
*Society for the Protection of NH Forests/NH GRANIT - 2011
Sources:
Conservation areas and Town Boundaries from NH Granit.
Focus areas approximated from a map by NH Fish & Game and by USFWS.
Background image NAIP 2008.
0 0.5 1 2 Miles
0 0.5 1 2 3 Kilometers


Great Bay National Wildlife Refuge - Comprehensive Conservation Plan
New England Cottontail
Rollinsford and Dover East Focus Areas
Rollinsford Focus Area
Rollinsford
South Berwick, Maine
Dover
Dover East Focus Area
USFWS Focus Areas
NH Conservation Lands
Term of Protection*
Limited
Perpetual
Unknown
New Hampshire Towns
Town Boundaries
0 0.5 1 2 Miles
0 0.5 1 2 3 Kilometers

- species of greatest conservation need in the coastal plain of New England, such as Blanding's turtle, black racer, and hognose snake.

- *Great Bay Estuary* (map 3.3): The refuge seeks a greater role in the GBRPP, particularly in working with interested private landowners on the eastern side of the bay, extending from the current refuge boundaries south to Pierce Point in Greenland and east to the airport. In addition to protecting important habitats along the bay, these lands could offer potential boat access to the bay and opportunities for wildlife observation, hunting, and ice fishing.

- *Hampton-Seabrook-Salisbury Marsh* (map 3.4): The 5,000-acre Hampton-Seabrook Estuary is the largest contiguous area of salt marsh and tidal flats in New Hampshire. It forms the northern part of an extensive salt marsh system that extends south to Cape Ann, Massachusetts. Parker River Refuge is also part of this "Great Marsh." Although the Hampton-Seabrook Estuary is surrounded by development, and affected by ditching and tidal restrictions, it retains significant ecological value and supports a diversity of wildlife (McKinley and Hunt 2008). Several Federal trust species occur here, including a population of breeding salt marsh sparrows.

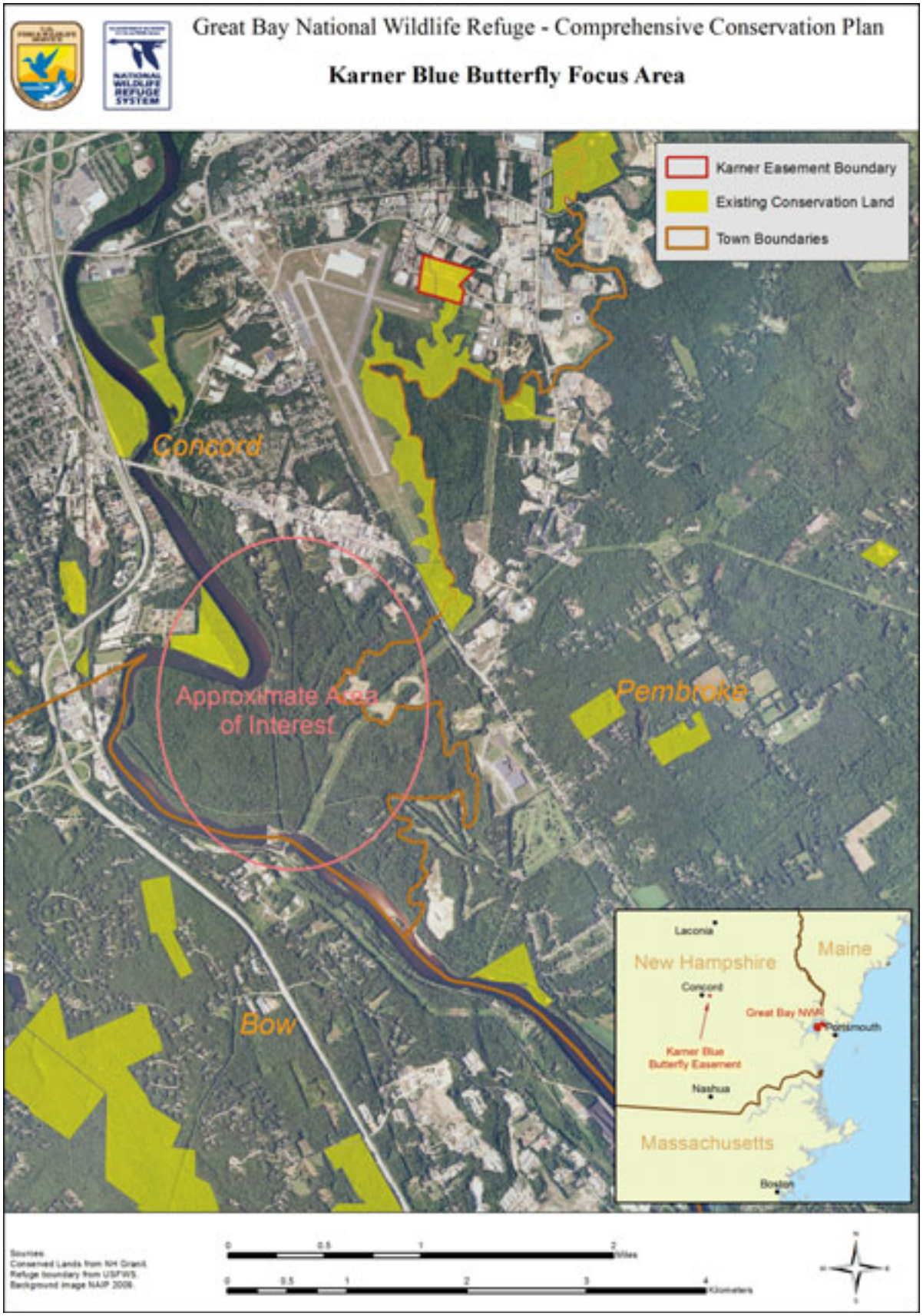
Focus Area for Karner Blue Butterfly in the Concord Pine Barrens
The Concord pine barrens support the only remnant population of the federally listed endangered Karner blue butterfly in New England. However, the existing 29-acre conservation easement managed by the refuge and lands under a 50-year management agreement with the city of Concord do not provide sufficient habitat to maintain a sustainable wild population (USFWS 2003, Fuller 2008). In consultation with NHFG, the Service has identified significant habitat for the Karner blue butterfly on adjacent lands that are not currently protected (map 3.5). The powerline corridor that runs through this focus area serves as a primary dispersal corridor for the butterfly. The Air National Guard also owns significant land that has suitable habitat for the butterflies. PSNH and the Air National Guard are two important partners in this focus area. Some of the lands under consideration in this focus area would also provide habitat for New England cottontail.

Historical Buildings
We have initiated consultation with SHPO to assess the National Historic Register eligibility of all structures in the former Weapons Storage Area and the Fabyan Point cabins. We expect this review to be completed within 1 year of CCP approval. If any structures are determined to be ineligible, we would plan to remove them, as funding and staffing allows. The only exception is under alternative B, if the bunkers are determined ineligible, we would plan to keep one or two them for possible use as bat hibernacula. If any of the structures are determined eligible, we would evaluate management options and/or mitigation measures with SHPO.

The Margeson Estate is on the National Register, but is in poor condition due to a lack of funding and resources available to maintain it. Our consultation with SHPO includes evaluating management options and/or mitigation measures for the estate. We have indicated to SHPO that our preferred alternative is recording the site and then demolishing the buildings. If we pursue demolition, with SHPO concurrence, additional NEPA analysis may be required.


Great Bay National Wildlife Refuge - Comprehensive Conservation Plan
East Great Bay Focus Area
Durham
Great Bay NWR
Newington
Pease International Tradeport
Approximate Area of Interest
Great Bay
Portsmouth
Pierce Point
Greenland
Existing Conservation Land
Town Boundaries
95
Miles
Kilometers


Great Bay National Wildlife Refuge - Comprehensive Conservation Plan
Hampton - Seabrook - Salisbury Marsh Focus Area
Hampton-Seabrook-Salisbury Marsh
Existing Conservation Land
Town Boundaries
Hampton Falls
Maine
Great Bay NWR
New Hampshire
Approx. Area of Interest
Parker River NWR
Massachusetts
Seabrook
Approximate Area of Interest
New Hampshire
Massachusetts
AMESBURY
SALISBURY
NEWBURYPORT
Miles
Kilometers


Great Bay National Wildlife Refuge - Comprehensive Conservation Plan
Karner Blue Butterfly Focus Area
Karner Easement Boundary
Existing Conservation Land
Town Boundaries
Concord
Approximate Area of Interest
Pembroke
Bow
Laconia
New Hampshire
Maine
Concord
Great Bay NWR
Portsmouth
Karner Blue Butterfly Easement
Nashua
Massachusetts
Boston
Sources
Conserved Lands from NH Granit
Refuge boundary from USFWS
Background image NAIP 2008
Miles
Kilometers

Wild turkey on the refuge

Greg Thompson/USFWS

Alternatives or Actions Considered but Eliminated From Detailed Study

Based on public scoping and internal agency discussions, we considered several other alternatives, but eliminated from further study.

- **Developing Great Bay Refuge as a Major Interpretive Center for the Cold War Era** As a former Air Force Base, many military artifacts remained when the land was transferred to the Service. This included the many buildings and bunkers in the former Weapons Storage Area. We decided to begin removal of these facilities many years ago and, as funding allows, we continue to remove the structures. Maintaining the former Weapons Storage Area and other military structures is not consistent with the purposes for which the refuge was created. Therefore, the Service did not pursue this as an alternative. However, under alternative B, goal 4, objective 4.2, we do propose developing outreach information and self-guided interpretive materials to interpret the Cold War Era history of refuge lands.

- **Maximizing Public Use and Access, Including Providing Fish Opportunities** Great Bay Refuge is a relatively small refuge making it difficult to balance the protection of unique ecological features and wildlife habitats with providing public access that exposes visitors to the diversity of habitats. Greatly expanded public use, such as greater access to the refuge shoreline or more remote areas, would not be consistent with the purposes for which this refuge was established. Specifically, it would potentially degrade important wetland habitats on Great Bay Estuary and would disturb wildlife that has limited sanctuary in the area.

  In addition, past land uses, including the former Air Force Base, left behind contaminated sediments in the Peverly Brook system, which remain a human and wildlife health concern. Given these contamination issues, opening the refuge to fishing is not recommended.

  Therefore, we eliminated consideration of an alternative that greatly expands public use programs and increased access. However, visitor programs and public access would be more conservatively enhanced and expanded under alternatives B and C.

Alternatives Analyzed in Detail

Alternative A–Current Management

This alternative describes our current management of Great Bay Refuge, including activities currently underway, funded, or approved. Alternative A serves as a baseline for comparing the other two alternatives. In 2008, the 1,103-acre refuge was de-staffed. At that time, Parker River Refuge assumed administrative responsibilities for Great Bay Refuge, the Karner blue butterfly conservation easement, and Wapack Refuge in Hillsborough County, New Hampshire. Based on the limited staffing available, under this alternative we would continue to focus our biological program on the present priorities, including maintaining impoundments for migratory birds, managing grasslands for upland sandpipers and other grassland dependent species of concern, and inventorying and controlling invasive plant species. We would also continue to rely on a small, but active, group of volunteers to help with seasonal activities. The Parker River Refuge refuge manager would continue to serve on key partnership committees, such as the GBRPP and to work with the adjacent Pease Airport on wildlife and airstrike hazards.

With regards to visitor services on Great Bay Refuge, we would continue to host a 2-day fall deer hunt, with assistance from NHFG. The two existing pedestrian trails would remain open to offer wildlife observation and photography opportunities. The rest of the refuge would remain closed, including the refuge office, since there are no refuge staff onsite. We would continue to rely on our partners, including the town of Newington and other Service programs, to assist with law enforcement. We would continue to have limited ability to respond to requests for environmental education and interpretive programs.

On the Karner blue butterfly easement, we would continue to actively manage habitat for Karner blue butterflies in partnership with NHFG.

The existing habitat types are depicted on map 3.6. Map 3.7 shows the refuge's current infrastructure and facilities, including those that support the refuge's public use program.

GOAL 1.

Perpetuate the biological integrity, diversity, and environmental health of estuarine and freshwater habitats on Great Bay Refuge to protect water quality and sustain native plant communities and wildlife, including species of conservation concern.

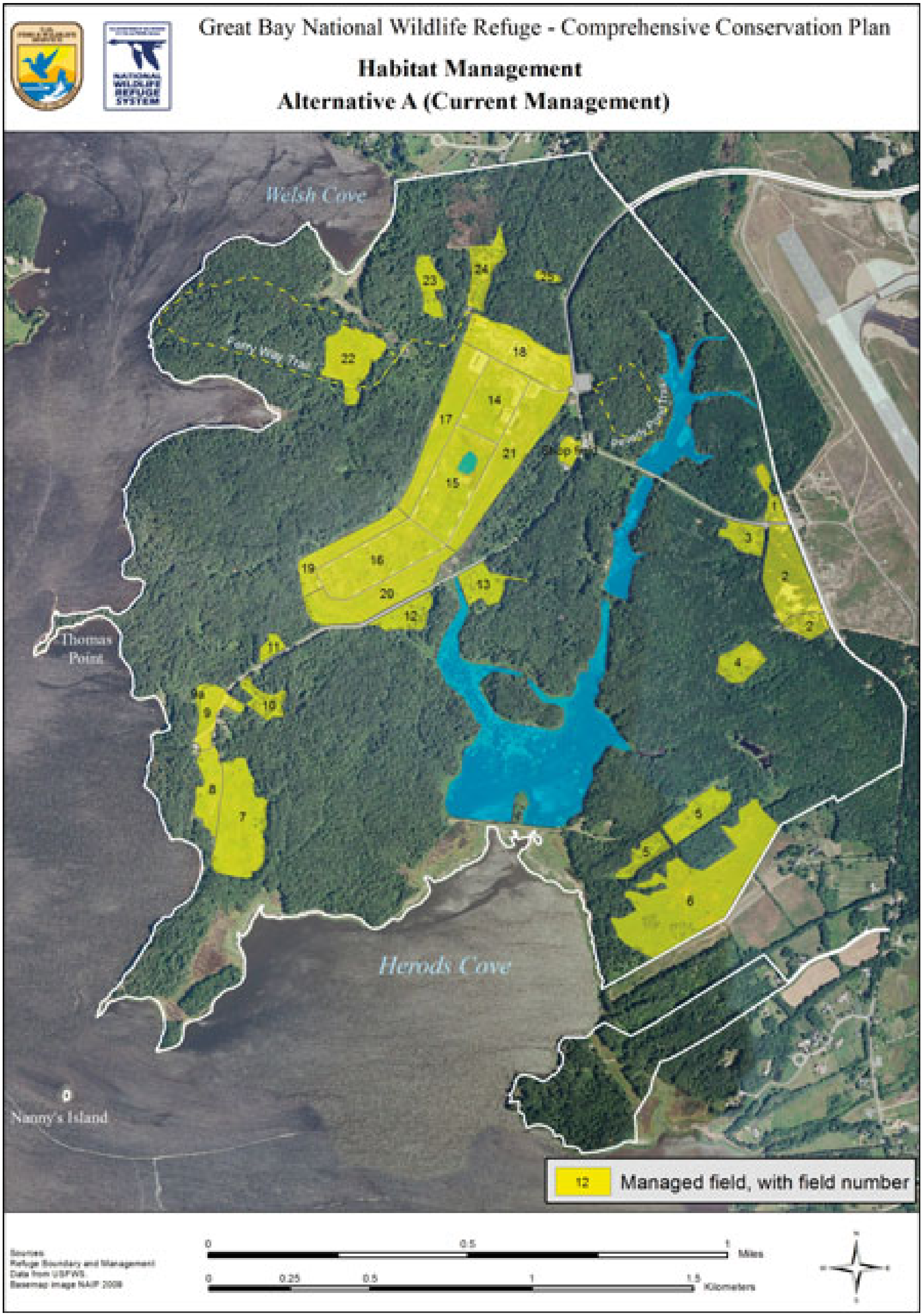
Objective 1.1 (Salt Marsh)

Annually maintain the existing quality and natural function of the refuge's 36 acres of salt marsh that supports a mix of native high and low marsh plant species including smooth cordgrass, salt meadow cordgrass, spikegrass), and black grass, with less than 1 percent overall cover of invasive plants, to provide habitat for salt marsh sparrows, wintering American black ducks, foraging wading birds, fish, and rare plants.

Rationale
See rationale under alternative B, goal 1, objective 1.1.

Strategies
Continue to:

- Maintain the existing quality and function of 36 acres of salt marsh, including a mix of high and low marsh vegetation, with less than 1 percent cover invasive plants
- Prohibit public access to salt marsh habitats.


Great Bay National Wildlife Refuge - Comprehensive Conservation Plan
Habitat Management
Alternative A (Current Management)
Welsh Cove
Herods Cove
Thomas Point
Nanny's Island
Ferry Way Trail
12 Managed field, with field number
Miles
Kilometers